

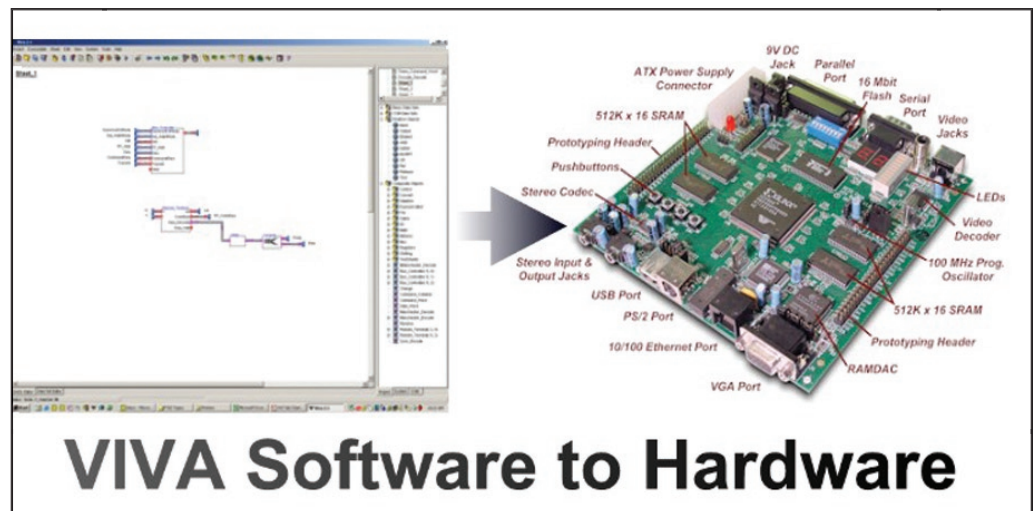


Air Force Research Laboratory | AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

RECONFIGURABLE COMPUTING SOFTWARE ENABLES EASY PROGRAMMING OF HARDWARE



Government and industry have invested many millions of dollars over the past decade to develop a way to easily program algorithms into field programmable gate array (FPGA) integrated circuits to meet the changing requirements of their users. Reconfigurable computing (RC) technologies enable lower integration cost, faster fielding of systems, in-field upgrading of systems, and longer system life. Traditional approaches to programming algorithms in FPGAs are laborious and time-consuming. Star Bridge Systems® of Midvale, Utah, developed an electronics design automation tool called Viva® that solves these problems.



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Accomplishment

The Munitions (MN) Directorate and Star Bridge Systems formed a Cooperative Research and Development Agreement (CRADA) to test and demonstrate the Viva tool for munitions applications. This CRADA demonstrated the capability to program third party commercial off-the-shelf hardware with Viva.

Until now, Star Bridge Systems only demonstrated Viva on the company's FPGA boards called Hypercomputers®. Directorate engineers chose to demonstrate the inexpensive XESS XSV-300/800 Virtex prototyping board, which has a XILINX's Virtex FPGA embedded in a framework for processing video and audio signals. Directorate engineers will use the XESS prototyping boards for cooperative control and automatic target recognition research at the RC laboratory at North Carolina A&T (NCAT) State University.

Background

Star Bridge Systems developed their reconfigurable computer technology for desktop high-performance computing with real-time processing. The directorate began investigating RC technology under its Revolutionary Technology program and, through this effort, helped create the RC laboratory at NCAT University (a historically black university).

Since RC was a new area for directorate scientists, they also began collaborating with the Information (IF) and Space Vehicles (VS) Directorates due to their previous research in the RC area. This collaboration led to a joint MN-IF Small Business Innovation Research (SBIR) RC effort. It also brought forth a leveraged VS-MN SBIR RC effort.

MN is also collaborating with the National Aeronautics and Space Administration (NASA) Langley Research Center, Los Alamos National Laboratory, and the National Security Administration (NSA). NSA and NASA are using Star Bridge Systems' Hypercomputers, which are programmed with Viva, for high-performance scientific computing, research, and national security applications; whereas MN is using Viva for embedded hardware applications implemented in various FPGA hardware systems including the XESS XSV-300/800 Virtex prototyping board used by MN on this project.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-MN-04)

Munitions
Emerging Technologies